GP-303188

CLAIMS

1. (original) A process for disengaging a releasable fastener system, comprising:

preconditioning the releasable fastener system to a preconditioning temperature, wherein the releasable fastener system comprises a hook portion comprising a plurality of hook elements fabricated from a shape memory material and a loop portion engageable with the plurality of hook elements, and wherein the preconditioning temperature is less than the transformation temperature of the shape memory material;

applying a primary activation signal to the hook portion to change a shape orientation, a flexural modulus property, or a combination thereof to the plurality of hook elements; and

disengaging the hook portion from the loop portion.

2. (original) The process of Claim 1, wherein preconditioning the releasable fastener system comprises periodically heating the releasable fastener system to the preconditioning temperature.

3. (original) The process of Claim 1, wherein the shape memory material comprises a shape memory polymer, a shape memory alloy, a composite of different shape memory alloys or combinations comprising at least one of the foregoing shape memory materials.

4. (original) The process of Claim 1, wherein the shape memory alloy fiber comprises a nickel-titanium based alloy, an indium-titanium based alloy, a nickel-aluminum based alloy, a copper based alloy, a gold-cadmium based alloy, an iron-platinum based alloys, or an iron-palladium based alloys.

5. (original) The process of Claim 1, wherein the shape memory polymer comprises polyphosphazenes, poly(vinyl alcohols), polyamides, polyester amides, poly(amino acid)s, polyanhydrides, polycarbonates, polyacrylates, polyalkylenes, polyacrylamides, polyalkylene glycols, polyalkylene oxides, polyalkylene terephthalates, polyortho esters, polyvinyl ethers, polyvinyl esters, polyvinyl halides, polyesters, polylactides, polyglycolides, polysiloxanes, polyurethanes, polyethers, polyether amides, polyether esters, or copolymers thereof.

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6. (original) The process of Claim 1, wherein preconditioning the releasable fastener system comprises heating the environment in which the releasable fastener system is disposed.

7. (original) The process of Claim 1, wherein preconditioning the releasable fastener system comprises applying a secondary activation signal to the releasable fastener system to heat the plurality of hook elements.

8. (original) The process of Claim 1, wherein applying the primary activation signal releases the plurality of hook elements from the loop portion in less than about 0.5 seconds.

9. (original) The process of Claim 1, wherein the preconditioning temperature is greater than about 50 percent of the temperature difference between an ambient temperature and the transformation temperature.

10. (original) A process for operating a releasable fastener system, comprising:

periodically preconditioning the releasable fastener system to a preconditioning temperature upon receipt of a first signal, wherein the releasable fastener system comprises a hook portion comprising a plurality of hook elements fabricated from the shape memory material and a loop portion engageable with the plurality of hook elements, and wherein the preconditioning temperature is less than a transformation temperature of the shape memory material;

applying a second signal to the hook portion to change a shape orientation, a flexural modulus property, or a combination thereof to the plurality of hook elements, wherein the second signal raises the preconditioning temperature to the transformation temperature; and

disengaging the hook portion from the loop portion, wherein the releasable fastener system remains engaged in the absence of the second signal.

11. (original) The process of Claim 10, wherein the shape memory material comprises a shape memory polymer, a shape memory alloy, a composite of different shape memory alloys or combinations comprising at least one of the foregoing shape memory materials.

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12. (original) The process of Claim 11, wherein the shape memory alloy comprises a nickel-titanium based alloy, an indium-titanium based alloy, a nickel-aluminum based alloy, a copper based alloy, a gold-cadmium based alloy, an iron-platinum based alloys, or an iron-palladium based alloys.

13. (original) The process of Claim 10, wherein the shape memory polymer comprises polyphosphazenes, poly(vinyl alcohols), polyamides, polyester amides, poly(amino acid)s, polyanhydrides, polycarbonates, polyacrylates, polyalkylenes, polyacrylamides, polyalkylene glycols, polyalkylene oxides, polyalkylene terephthalates, polyortho esters, polyvinyl ethers, polyvinyl esters, polyvinyl halides, polyesters, polylactides, polyglycolides, polysiloxanes, polyurethanes, polyethers, polyether amides, polyether esters, or copolymers thereof.

14. (original) The process of Claim 10, wherein the plurality of hook elements fabricated from the shape memory material does not transform during periodic preconditioning.

15. (original) The process of Claim 10, wherein applying the second signal releases the plurality of hook elements from the loop material in less than about 0.5 seconds.

16. (original) The process of Claim 10, wherein the preconditioning temperature is greater than about 50 percent of the temperature difference between an ambient temperature and the transformation temperature.

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17. (original) A process for operating a releasable fastener system, comprising:

applying a first activation signal to the releasable fastener system, wherein the releasable fastener system comprises a hook portion and a loop portion engageable with the plurality of hook elements disposed on the hook portion, wherein the plurality of hook elements comprises a first hook element portion fabricated from a shape memory material and at least one additional hook element portion fabricated from a different shape memory material;

changing a shape orientation, a flexural modulus property, or a combination thereof, of the first hook element portion in response to the first activation signal;

applying a second activation signal to the releasable fastener system;

changing a shape orientation, a flexural modulus property, or a combination thereof, to the second hook element portion in response to the second activation signal; and

disengaging the hook portion from the loop portion.

18. (original) The process of Claim 17, wherein applying the second activation signal releases second hook element portion from the loop portion in less than about 0.5 seconds.

19. (original) The process of Claim 17, wherein the preconditioning temperature is greater than about 50 percent of the temperature difference between an ambient temperature and the transformation temperature.

20. (original) The process of Claim 17, wherein the shape memory material comprises a shape memory polymer, a shape memory alloy, a composite of different shape memory alloys or combinations comprising at least one of the foregoing shape memory materials.

21. (original) The process of Claim 20, wherein the shape memory alloy comprises a nickel-titanium based alloy, an indium-titanium based alloy, a nickel-aluminum based alloy, a copper based alloy, a gold-cadmium based alloy, an iron-platinum based alloys, or an iron-palladium based alloys.

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22. (original) The process of Claim 20, wherein the shape memory polymer comprises polyphosphazenes, poly(vinyl alcohols), polyamides, polyester amides, poly(amino acid)s, polyanhydrides, polycarbonates, polyacrylates, polyalkylenes, polyacrylamides, polyalkylene glycols, polyalkylene oxides, polyalkylene terephthalates, polyortho esters, polyvinyl ethers, polyvinyl esters, polyvinyl halides, polyesters, polylactides, polyglycolides, polysiloxanes, polyurethanes, polyethers, polyether amides, polyether esters, or copolymers thereof.

23. (currently amended)A process for operating a releasable fastener system, comprising:

preconditioning the releasable fastener system to a preconditioning temperature;

applying a first activation signal to the releasable fastener system, wherein the releasable fastener system comprises a hook portion and a loop portion engageable with the plurality of hook elements disposed on the hook portion, wherein each one of the plurality of hook elements comprises a fuse portion having a lower melting point temperature than a remaining portion of each one of the plurality of hook elements, wherein the preconditioning temperature is below the lower melting point temperature of the fuse portion;

melting the fuse portion of the plurality of hook elements with the activation signal; and

irreversibly disengaging the hook portion from the loop portion.

24. (canceled)

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